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JUNIOR HIGH SCHOOL MATHEMATICS COURSE OUTLINES

Sept., 1969

Objectives

The objectives for junior high school mathematics courses are:

- 1 To develop an understanding of mathematical concepts and an appreciation of mathematical structure.
- 2 To develop skill in the use of the fundamental processes.
- 3 To develop systematic methods of analyzing problems and of presenting their solutions.
- 4 To develop habits of precise thought and expression.
- 5 To develop an understanding of the significance and application of mathematics in the modern world.

Recommended Texts

- 1 -Grade VII: CONTEMPORARY MATHEMATICS 1, Hanwell et al  
EXPLORING MODERN MATHEMATICS, Book I, Keedy et al  
SEEING THROUGH MATHEMATICS, Book I, Special Edition, Van Engen et al
- 2 -Grade VIII: CONTEMPORARY MATHEMATICS 2, Hanwell et al  
EXPLORING MODERN MATHEMATICS, Book II, Keedy et al  
SEEING THROUGH MATHEMATICS, Book II, Special Edition, Van Engen et al
- 3 -Grade IX: CONTEMPORARY MATHEMATICS 3, Hanwell et al  
EXPLORING MODERN MATHEMATICS, Book III, Keedy et al  
SEEING THROUGH MATHEMATICS, Book III, Special Edition, Van Engen et al

Junior High School Mathematics Course Outlines

The following list of topics indicates the program of studies in junior high school mathematics. While the list has been distributed through three years of study, it is not necessary to follow the yearly sequence of topics indicated. If departures from the sequence are made, coordination in the school should ensure that the complete program has been offered by the end of the junior high school period.



Grade VII Mathematics

## A        Sets

- 1 An understanding of the concepts of set and subset
- 2 The ability to make appropriate use of set notation
- 3 Knowledge of and ability to perform the operations of union and intersection

## B        The Whole Number System

- 1 The position of whole numbers on the number line
- 2 Ability to perform operations on the whole numbers
- 3 Recognition and identification of the following number system properties of operations on the whole number system:
  - a) closure
  - b) commutative
  - c) associative
  - d) distributive
- 4 The properties of the identity elements
- 5 Conventions for the order of operations in simplification of expressions
- 6 Operations with number sentences containing variables - equalities and inequalities
- 7 Use of number sentences to solve problems

## C        Factors and Multiples

- 1 Understanding and application of the terms 'factor' and 'multiple'
- 2 Identification of prime and composite numbers, and use of these characteristics
- 3 Prime factorization of composite numbers
- 4 Identification of common factors and common multiples of composite numbers
- 5 Calculation of GCF and LCM of numbers

## D        Fractional Numbers

- 1 Understanding fractional or rational numbers of arithmetic
- 2 The position and order of fractional numbers on the number line
- 3 The ability to perform operations accurately on fractional numbers
- 4 Recognition and identification of number system properties of operation on the fractional number system
- 5 Decimal numeral representation of fractional numbers, and the expansion of the decimal numeration system
- 6 Computations using decimal numerals
- 7 Transformation of fractional numbers into decimal numeral form; repeating and terminating decimals
- 8 Simplification of expressions and the solution of problems involving fractions

## E Rates, Ratio and Percent

- 1 Development of the concepts, common and unique properties of ratio and rate
- 2 The meaning of percent
- 3 Transformation of percent into decimal and fractional equivalents
- 4 Solution of problems using and involving rates, ratio and percent

## F Geometry

- 1 Development of the ability to recognize and identify the following elements of plane geometry, and extending knowledge of the inter-relationships of these elements: point, line, plane, segment, ray, curve, closed curve, angle, triangle, other simple polygons, circle, interior and exterior regions

## Grade VIII Mathematics

### A Rational Numbers

- 1 An examination of integers as a subset of the rational numbers
- 2 The position and order of integers on the number line
- 3 Extending computational facility and understanding of the operations on integers
- 4 Extending knowledge of closure, associative, commutative, distributive, and identity properties of operations on integers
- 5 Extending the number system to positive and negative rational numbers
- 6 The position and order of the extended system on the number line
- 7 Operations  $+$   $-$   $\times$   $\div$  in the rational number system
- 8 Number system properties in the rational number system
- 9 Investigation and understanding of the properties of zero
- 10 Reinforcement of computational skills with fractional numbers including decimal numerals
- 11 Development of the concept, notation and computational skills of exponents and related properties:
  - a) positive, negative, and zero integral powers
  - b) use of exponential notation in multiplication and division

### B Conditions or Equations

- 1 Use of conditions or equations in the solution of problems involving equalities and inequalities
- 2 Use of graphs to determine the solutions to conditions or equations
- 3 The solution of problems involving conditions or equations

## C      Geometry

- 1 The measure and comparison of segments using British and metric units
- 2 Measurement of angles
- 3 Categorization of the types of angles formed by the intersection of coplanar lines
- 4 The triangle, including classifications, similarity, perimeters, areas, and the unique property of the sum of the interior angles
- 5 The quadrilaterals, including classifications, perimeters and areas
- 6 Classification of polygons
- 7 Simple geometric constructions: bisectors of angles and segments, construction of parallels and perpendiculars, and construction of simple polygons
- 8 The circumference and area of circles
- 9 Applications of geometry to the solution of problems

## D      One of the following three topics:

## Introduction to Real Numbers

- 1 Extension of the number system to include irrational numbers
- 2 Properties of the operations on the real numbers: closure, commutative etc.
- 3 Additional properties of the number system: order, completeness, density
- 4 An introduction to graphing on the real plane
- 5 Solution of problems involving conditions or equations with real numbers

## OR      Introduction to Polynomials in One Variable

- 1 Introduction to polynomials
- 2 Addition, subtraction and multiplication of polynomials

## OR      Extension of Geometry

- 1 The characteristics of congruent and similar triangles
- 2 The Pythagorean Theorem and its applications
- 3 Categorization, surface areas and volumes of prisms, cylinders, cones, pyramids and spheres
- 4 Solution of practical problems in geometry

Grade IX Mathematics

NOTE: The specific topics remaining for presentation in the third year of junior high school will depend upon the option elected for Unit D in the Grade VIII year. Those options not taught in Grade VIII should be included in the Grade IX program.

## A      Extension of Real Numbers

- 1 Introduction to real numbers (see Grade VIII program, Section D-1)
- 2 Calculating and graphing solutions to problems involving conditions or equations
- 3 Solution of problems involving real numbers

## B      Extensions of Polynomials

- 1 Introduction to polynomials (see Grade VIII program, Section D-2)
- 2 Factoring of polynomials:
  - a) common factor
  - b) difference of squares
  - c) trinomials that are perfect squares
  - d) trinomials that are the products of binomials
- 3 Division of polynomials, extension of rational expressions
- 4 Addition, subtraction, multiplication and division of rational expressions
- 5 An awareness of absolute value of an expression
- 6 Solution of problems involving linear conditions

## C      Extension of Geometry

- 1 (see Grade VIII program, Section D-3)

## D      Variation

- 1 A study of direct and inverse variation
- 2 The expression of linear and parabolic expressions in graphic form
- 3 Common formulae in applied business and science
- 4 The solution of problems involving applications of variation and formulae



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